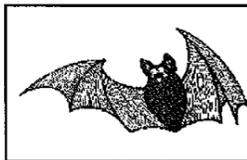




Backup payload specialists have been likened to baseball relief pitchers, but there's even more involved. Story on Page 3.



Get ready to buy your tickets for the annual Halloween Dinner Dance at the Gilruth Center. Story on Page 4.

Space News Roundup

Vol. 32

October 4, 1993

No. 39

More tests for telescope's new camera

NASA will conduct additional tests to verify that the second generation Wide Field/Planetary Camera is ready to be installed on the Hubble Space Telescope.

The tests, recommended by an independent review panel late last week, can be conducted at Kennedy Space Center and are not expected to delay *Endeavour's* planned launch in December.

The decision followed an exhaustive review of the test data by scientists and engineers at KSC after earlier tests at Goddard indicated the focus point of the instrument might be outside the adjustment range for on-orbit focusing by remote control.

A potential explanation of the discrepancy, arrived at the evening of Sept. 24 after around-the-clock evaluations, indicated the problem was with the est instrumen. The independent review panel was then convened at Goddard.

On-orbit focusing, according to Joseph Rothenberg, associate director of flight projects for HST at Goddard, involves focusing WF/PC-2 by moving the observatory's secondary mirror. Once the instrument is focused, the corrective optics package with its adjustable mirrors is focused so that both instruments are in focus using the same secondary mirror position. The difference between the two instruments during this focusing process is called confocality (instrument to instrument change).

At first, it was thought that error margins might be at the edge of the Corrective Optics Space Telescope Axial Replacement's adjustment range and that focusing both instruments at the same time might not be possible.

The error was thought to be about 7.5 millimeters, or a third of an inch. But the preliminary review showed the confocality margin was about 1.5 millimeters, well within the COSTAR adjustment range.

A manufacturing flaw in the observatory's primary mirror has reduced HST scientific achievements, but it has amassed an impressive record of discoveries in spite of the spherical aberration.

COSTAR, built by Ball Aerospace, Boulder, Colo., is designed to correct for the manufacturing flaw and improve the capabilities of the three remaining instruments on the telescope.



JSC Photo by Scott Woicles

ASTRONAUT HOPEFUL — NASA Pilot Stephanie Wells adjusts a NASA flight helmet on the head of 11-year-old Victoria Van Meter, who visited JSC last week after her record-setting cross-country flight in a single-engine Cessna 172. Van Meter became the youngest person to ever make the east-to-west crossing, flying from Augusta, Maine, to San Diego in four days. While at JSC, the wouldbe astronaut visited the shuttle mock-up in Bldg. 9, learned first-hand from Tammy Jernigan what it is like to be an astronaut, and landed the shuttle on a simulator at Space Center Houston on her second try.

Columbia on schedule for Oct. 14

By James Hartsfield

All preparations for a launch of *Columbia* around Oct. 14 on STS-58, the second Spacelab Life Sciences flight, were on schedule late last week as shuttle managers headed for a final review of the mission.

An official launch date for the 14-day flight, the longest planned shuttle mission to date, was expected to be announced following the flight readiness review of all mission preparations at Kennedy Space Center on Friday.

The SLS-2 crew—Commander John Blaha, Pilot Rick Searfoss, Payload Commander Rhea Seddon, Mission Specialists Bill MacArthur, Dave Wolf and Shannon Lucid, and Payload Specialist Martin Fettman —will dedicate the flight to research on how weightlessness affects the human body, plants and animals.

Work on *Columbia* this week, now at Launch Pad 39B, included a hot-fire of two auxiliary power units; tests of the main engine valves and electrical connections; checks of the wing flaps and rudder functions; late stowage of gear in the Spacelab module; and loading hypergolic propellants, fuels that ignite on contact, into the orbital propulsion systems.

Elsewhere at KSC, *Discovery*, fresh from space and STS-51, is now in the Bay 3 processing hangar, with technicians reporting little damage found on the spacecraft from its recent flight. *Discovery* will now be



Please see STS-61, Page 4

Spacelab results come down to Earth

Researchers find commercial uses for USML-1, USMP-1 discoveries

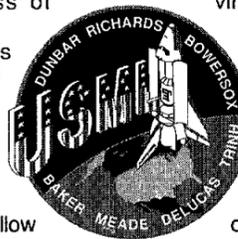
Results from a Spacelab crystal growth experiment flown aboard the space shuttle last summer have brought researchers a step closer to developing more effective disease-fighting, anti-parasitic drugs.

The resolution of malic enzyme crystals produced during the first United States Microgravity Laboratory mission on STS-50 showed a dramatic improvement over Earth-grown crystals. Those crystals are helping scientists understand the molecular structure of proteins that could be used in medicines.

"On USML-1, using experiment hardware specifically designed for the mission, we learned how to grow the high quality malic enzyme crystals," said Dr. Lawrence J. DeLucas. "Then on shuttle mission

STS-57 in June of this year, we produced additional crystals of comparable quality. Now, we just need a few more flights to accumulate enough of these superior crystals to complete the process of structure identification."

This success follows two years and several hundred ground-based crystallization trials, during which researchers were unable to produce any crystals of high enough quality to allow determination of this protein's structure. Protein crystal growth experiments have flown on 18 shuttle missions since April 1985, producing a number of crystals of a quality significantly superior to Earth-grown crystals.



Space-grown crystals have contributed to the refinement of molecular structures of many medically-significant substances including gamma interferon, a protein important in antiviral research and for treatment of certain types of cancer; human serum albumin, the most abundant protein in human blood which is responsible for distribution of many different drugs, including aspirin, to various body tissues; elastase, a key protein known to cause the destruction of lung tissue in patients suffering from emphysema; and factor D, a protein important in inflammation and other immune system responses.

Protein crystal growth experiments

also have produced superior quality crystals of: isocitrate lyase, a protein important for the development of anti-fungal drugs; canavalin, a protein isolated from edible plants whose structure is of interest because the information can be used to genetically engineer more nutritious plants; and proline isomerase, a protein important in and used as a drug for diabetes.

"Although valuable new information was obtained from these initial experiments, additional high quality crystals are needed to obtain the final structures for many of these proteins," DeLucas said. "Also, a constant supply of the crystals is necessary for the drug design phase for those proteins associated with various diseases."

Please see USMP-1, Page 4

Safe landings signal satellite system success

NASA research aircraft are demonstrating the first precision, automatic approaches and landings using Differential Global Positioning System navigation satellite signals.

The accuracy of recent tests by Langley Research Center and Wilcox Electric of Kansas City, Mo., using DGPS and a simple "code tracking" signal-processing technique appear to satisfy tough Federal Aviation Administration requirements for landings in low-visibility conditions.

"We've picked up where other recent flight tests have left off," said Wayne Dohman, Wilcox Electric's business development director. "This is the first time a DGPS autoland has been achieved without the use of special equipment or processing

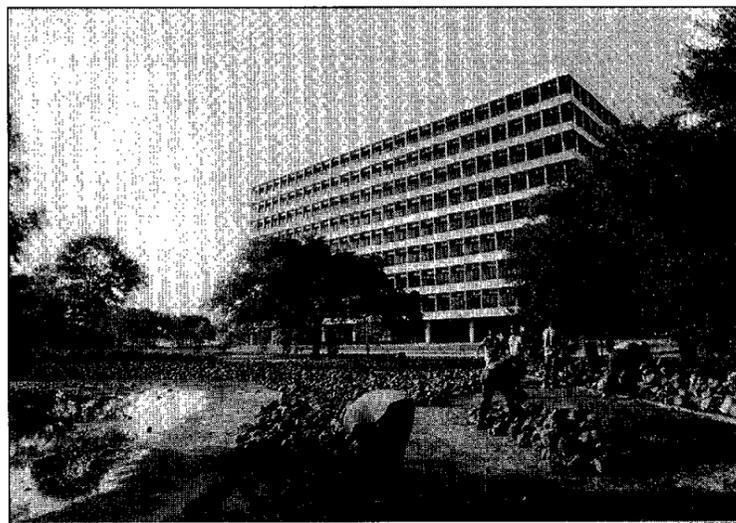
techniques such as pseudolites or carrier phase tracking."

Seventeen "hands off" approaches and landings were completed using Wilcox DGPS avionics installed in NASA's Boeing 737 research aircraft at Wallops Flight Facility in Virginia.

Ground instrument data to confirm that the tests achieved the desired accuracies will be analyzed next month, but observations based on flight performance were encouraging.

"The system performed exceptionally well and consistently, especially for a first flight test. I'm looking forward to analyzing the data," said Richard Hueschen, NASA flight test project engineer.

Please see GLOBAL, Page 4



JSC Photo by Andrew Patnesky

HARD WORK — Employees of JSC grounds maintenance contractor Four Seasons move and wash the rocks surrounding the koi pond in the central mall. Washing the rocks controls weed growth and is safer than treating the area with herbicides that are dangerous to the koi and the environment.

Unisys in running for quality award

Unisys Corp.'s Space Systems unit, which supplies software products and services for the space shuttle and space station, is one of 13 organizations in the final phase of competition for this year's Malcolm Baldrige National Quality Award.

The Space Systems unit also was the first recipient of the Unisys Chairman's Total Quality Award presented last year. Director of Excellence Charlie Daniels said "the Baldrige process produces extremely valuable business benefits. Through it, national experts evaluate every facet of our business and give us detailed feedback we will use to further improve our processes."

The formal process began this spring when Space Systems submitted its 77-page application for

Please see UNISYS, Page 4

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

EAA Texas Renaissance Festival Bus Trips — Oct. 23 and Nov. 13, includes bus transportation and admission: adult, \$16; child (5-12), \$11; child (under 5), \$7.

Texas Renaissance Festival — Weekends Oct. 2-Nov. 14. Discount tickets: adult, \$9.95; children 5-12 years, \$5.95.

Wings Over Houston Airshow — Oct. 16-17, Ellington Field: adult, \$7; child (6-11), \$2.

Entertainment '94 Coupon Books — Bay Area/Galveston/Downtown or FM 1960/Downtown: \$30 each, \$1 off first book for civil servants.

Space Center Houston — Discount tickets: adult, \$7.50; child (3-11), \$4.50; commemorative, \$9.95.

Metro tickets — Passes, books and single tickets available.

Movie discounts — General Cinema, \$4.50; AMC Theater, \$3.75; Loew's Theater, \$4.

Upcoming Events: EAA Halloween Dance, Oct. 30.

JSC

Gilruth Center News

Sign up policy — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. For more information, call x30304.

EAA badges — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday-Friday. Dependents must be between 16 and 23 years old.

Weight safety — Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. Oct. 6. Pre-registration is required. Cost is \$5.

Defensive driving — Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is Oct. 23. Cost is \$19.

Aerobics — High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise — Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido — Martial arts class meets from 5-7:30 p.m. Tuesdays. Cost is \$15 per month.

Ballroom dance — Beginner and advance classes meet from 7-8:15 p.m., and intermediate and advanced beginner meets from 8:15-9:30 p.m. Thursdays beginning Oct. 7. Cost is \$60 per couple for eight weeks.

Country and western dance — Beginner class meets from 7-8:30 p.m., and intermediate class from 8:30-10 p.m. Mondays beginning Sept. 27. Cost is \$20 per couple.

Fitness program — Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Weir at x30301.

JSC

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Sale: Univ Place 2-story TH, 3-2-5-2, gas heat, FPL, fenced, corner lot, porch. Dennis C., 282-5273 or 480-5361.

Sale: Lake Livingston, Impala Woods at Onalaska, 30' x 70' lot, camp or build, 0.5 mi off water, util avail, paved roads, \$3k. Teena, x37787 or 422-6369.

Sale: Sagemont, 3-2-2, both formals, new carport, new roof. Ben, x34339 or 481-1439.

Lease: Baywind 1 condo, 2-2-2, split floor plan, FPL, all appl, W/D conn, c/fans, outdoor storage, \$525/mo. Jim, x33821 or 480-2933.

Sale: 2 Bayou Vista lots, #132 and #133 Marlin, \$10k both or \$5k ea. Joe, 282-3155 or 409-945-2190.

Sale: Univ Green, 2-2-2, study, patio home, wet bar, deck, hot tub, landscaped, \$99.9k. x33734.

Lease: Pipers Meadow, 3-2-2, fenced, c/fans, blinds, avail Nov 1, '93, \$795/mo. 488-2946.

Sale/Lease: LC Countryside, 4-2-2, no approval assum, lg lot on cul-de-sac, cov deck, \$12k equity + \$770/mo or \$850/mo. x38843 or 409-925-5011.

Rent: LC, The Landing, 2-1, \$275 ea BR + equal share of util cost. 544-4944.

Sale: Pebblebrook condo, 2 BR, all appl, 2 balconies, FPL, \$32k. Laura, x31303 or 326-1573.

Rent: Heritage Park, 3-2-2, cul-de-sac, FPL, fenced. Geno, x44867 or 992-2156.

Rent: Univ Trace condo, 1 BR, study, W/D, storage, patio, alarm sys, \$445/mo + \$250 dep. Cindy, 337-6270.

Lease: Executive home, waterfront, lg swimming pool and yard, 4-4, study, formal DR, lawn service incl, \$2400/mo avail immed. 474-7883.

Rent: Southern Colorado, 2 BR, furn, sleeps 5, no smoking, no pets, day/wk/mo or longer. Bob, x30825 or 998-7372.

Sale: Nov 13-20, '93 at 5-star resort in Cancun, Mex, 2-2, was \$1400 now \$700. 992-3876.

Sale: Friendswood, 3-2-2, 7.3 ac, pond, atrium, separate workshop, solar, satellite, never flooded, 2400 sq ft. Jim, x39229 or 482-7873.

Rent: Galveston condo, furn, sleeps 6, Seawall Blvd at 61st St, wknd/wk/dly rates. Magdi Yassa, 333-4760 or 486-0788.

Lease: Meadowgreen, 3-2-5-2, 2-story, cul-de-sac, new paint, \$890/mo + dep. 486-8551.

Lease/Sale: Nassau Bay, 4-2-2, recently remodeled, \$850/mo or \$119.5K. Minh, x30992 or 484-2456.

Sale: Friendswood Wedgewood Village, 3-2-2, remodeled kitchen, vaulted ceiling, FPL, c/fans, new carpet/paint, big trees. 482-0874.

Rent: Westbury, 2-2-2, den, CA/H, FPL, c/fans, new carpet/paint, lg walk-in closets, screened porch, fenced, appl/micro. 729-8846.

Sale: Seabrook, 3-2-2A, FPL, well kept, lots of storage, \$61k. 474-9132.

Sale: Dickinson waterfront, 4-2-5-2, pool, trees, 3/4 acre, FB/WB, \$210k/206k. x34354 or 337-1640.

Sale: LC Countryside South, contempo 3-2.5-2A, 2-story, new paint/carpet, c/fans, custom window shades in SW tones, ceramic tiled kitchen, lg corner lot, \$84.5k. x38413 or 554-2728.

Rent: Arkansas cottage on Blue Mountain Lake, furn, wooded, 4 ac, screened porch, antiques, \$250/wk, \$50/day. x33005 or 334-7531.

Sale: Piper's Meadow, 4-2.5-2, new carpet/vinyl, low util, fans, miniblinds, auto garage dr opener, immed occupancy. Wayne, x36617 or 291-9020.

Sale: Wooded 90' x 135' waterview lot near JSC, \$42.5k. Don, x38039 or 333-1751.

Sale: LC waterfront marina TH, 2-2, \$99.5k. Steve Brody, 703-487-7138 or 703-532-3415.

Sale: Mobile home, 14' x 80', parked in San Leon, \$17k. 559-1437.

Cars & Trucks

'83 Olds Delta 88 Royale Brougham, white w/blue int, all pwr, good body, engine needs work, \$600. 482-2157.

'87 Nissan Maxima SE, AM/FM/cass, A/C, auto, sunroof, cruise, alarm, pwr windows/locks, 71k mi, ex cond, orig owner, \$5,275. x33475.

'91 Nissan Stanza XE, auto, air pwr windows/locks, tilt, cruise, AM/FM/cass, 60k mi, \$8.2k. James, x40045 or 332-1129.

'90 Jeep Cherokee Pioneer, white w/maroon int, full-time Selec-Trac 4WD, all pwr, auto, tow package, alarm, tinted windows, 26k mi, \$14k. Keith, 335-2514 or 332-9414.

'80 Datsun B-210 station wagon, white, 4 cyl, 5 spd. Ray, x41010.

'81 Mercedes 300SD turbo-diesel, dk grey, 18k mi on rebuilt eng, new tires, ex cond. x49843 or 532-2215.

'92 GMC Sportside truck, ex cond, 32k mi, loaded, alarm, \$13.9k. 996-5364.

'79 Dodge B-200 window van, 360 V8, PS, A/C, 5 pass, runs well, needs paint, \$1k OBO. Andy, x38277 or 409-925-8854.

'85 Ford Escort EXP, 124k mi, runs good, \$800 OBO. Dave, x45381.

'83 Cutlass Supreme Brougham, PW, PL, V6, auto, A/C, tinted windows, 4 dr, ex cond, \$2.2k. Mike, x31735 or 326-3775.

'84 Pontiac Bonneville, auto, loaded, 58k mi, new tires, \$3.2k. Andy, 992-1856.

'93 Chevy S-10 extended cab PU, loaded, V6, Jensen stereo/cass, JSC CU loan payoff, \$10.2k. Ray, 992-4064.

'92 IROC Daytona, \$10k. 244-8511.

'89 Toyota PU, 20k mi, white w/blue int. 474-7883.

'85 Blazer, K5, 4X4, ex cond, all pwr, Silverado pkg, 96k mi, \$6.2k. Tim, x31838.

'81 VW Rabbit diesel, 4 dr, rebuilt eng, new tires/shocks, A/C, no dents/rust, \$1,995. 280-9621.

'76 Datsun 280Z 2+2, 66k mi, elec problem but runs, some body rust, new tires, \$1.6k OBO. Gibson, x36224 or 488-6224.

'85 Honda Prelude, 60k mi, good cond, 5 spd, A/C, new AM/FM/CD, \$4k. Linda, x32885 or 538-1028.

'84 Toyota Supra, 91k mi, 5 spd, pwr windows/locks/mirrors. Mike, x30993 or 333-1856.

Boats & Planes

'87 Four Winn 16', skiing hook, w/trlr, \$6.5k. Eloina or Roger, 992-1781.

Bob Martin Hurricane 6'2" surfboard lg/matching leash, \$125; 7'4" Leroy Ah Choy Hobbie Hawaii big wave board w/interchangeable fin, \$50. Kevin, x36654 or 480-6264.

Cycles

'85 Raleigh Team USA 12 spd bike, ex cond, was \$350, now \$150. x33399 or 480-2929.

'88 Hurricane, 19k mi, tank bag, helmet, \$2.5k OBO. x34204 or 380-2954.

JSC

Dates & Data

Today

Flu shots — The JSC Clinic will offer influenza vaccines from 10 a.m.-noon and 2-3:30 p.m. through Jan. 31. For more information, call the clinic at x34111.

Cafeteria menu — Special: Italian cutlet. Total Health: herb flavored steamed pollock. Entrees: barbecue beef, spare ribs with kraut, steamed pollock, French dip sandwich. Soup: black bean and rice. Vegetables: California mix, okra and tomatoes, vegetable sticks, ranch style beans.

Tuesday

STS-51 briefing — The STS-51 post-flight presentation for employees and on-site contractors will be from 10:30-11:30 a.m. Oct. 5 in the Teague Auditorium.

Cafeteria menu — Special: corned beef hash. Total Health: baked potato. Entrees: meatballs and spaghetti, grilled liver and onions, beef cannelloni, ham steak Hawaiian. Soup: split pea. Vegetables: winter blend mix, seasoned cabbage, breaded squash, lima beans.

Wednesday

Cafeteria menu — Special: smoked barbecue link. Total Health: roast pork loin. Entrees: cheese enchiladas, roast pork and dressing, baked scrod, baked chicken, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, Spanish rice, turnip greens, peas and carrots.

Thursday

Blood drive — Lockheed will host a blood drive from 8:30-11:30 a.m. Oct. 7 in Tower I and from 1:30-4:30

p.m. in Tower II. For more information, call Jennie McQuillon at 212-5042 or Teresa Esquivel at 212-5036.

STS-51 briefing — Employees also are invited to share the STS-51 crew's post-flight public presentation at Space Center Houston at 12:30 p.m. Oct. 7. Employees will be admitted to Space Center Houston by showing their NASA or contractor badges at the turnstile. For more information, call 244-2130.

Cafeteria menu — Special: chicken fried steak. Total Health: roast beef with gravy. Entrees: roast beef with dressing, steamed pollock, lasagna with meat, baked chicken, French dip sandwich. Soup: beef and barley. Vegetables: whole green beans, butter squash, cut corn, black-eyed peas.

Friday

Cafeteria menu — Special: fried chicken. Total Health: vegetable lasagna. Entrees: broiled cod fish, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots vichy, Italian zucchini, breaded okra.

Monday

Columbus Day — Most JSC offices will be closed in observance of the Columbus Day holiday.

Oct. 13

Security Fair — The Security Division is hosting a Security Fair in Teague Auditorium from 10 a.m.-2 p.m. Oct. 13-14. Attendees can participate in a Firearms Training System demonstration, and meet with representatives of local, state

and federal law enforcement agencies.

Oct. 14

SSQ meets — The Society for Software Quality meets at 5:30 p.m. Oct. 14 at the Days Inn ballroom, 2020 NASA Road 1. Topic is the ISO-9000 standard. For more information, call Felix Balderas at x31899.

Oct. 31

Bike tour — The Lions Eye Bank of Texas and the JSC Bike Club are sponsoring the 15th Annual Texas Coastal Cruise. The ride will begin at 8 a.m. Oct. 31 at Clear Lake Park on NASA Road 1. For more information, call 798-5510.

Nov. 5

AFCEA nominations — The deadline for nominations for the Armed Forces Communications and Electronics Association Distinguished Young AFCEAN award is Nov. 5. For more information, contact Becky Nolan, at 703-631-6170.

Nov. 17

NCMA conference — The Space City-Houston Chapter presents its fall educational conference Nov. 17-18 at the South Shore Harbour Resort and Conference Center. For more information, call Carolyn Moe at x34158.

Nov. 23

Blood drive — The last on-site JSC blood drive of 1993 will be from 8-11:30 a.m. and 1-3:30 p.m. Nov. 23 at the Gilruth Center. For more information call Dan Mangieri, x33003; Mary O'Rear, x36531; or Susan Anderson, x33082.

Swap Shop

Audiovisual & Computer

'87 JVC Camcorder, VHS-C, 8:1 zoom, 5 lux, case, all access, \$450. 488-8126.

Canon NP400 copier and stand, \$485; 13" Sharp color TV, \$25; Mac Excel, Smart-Form Assistant, \$25 both. 919-1263 pager.

Commodore 64, color monitor, printer, modem, SW, \$200. 644-0315.

Gemini Star SG-10 printer, 9 pin, for PC-XT, \$35 OBO. Gary, x47566.

Pioneer stereo receiver w/graphic equalizer and turntable, 2 lg speakers w/stand, CD compat, ex cond, \$300. 471-2831.

Panasonic phone & answering machine, ex cond, was \$150, now \$99 OBO; NCI Telecaption machine, ex cond, was \$150, now \$99. Tom, 282-5236 or 480-7276.

Panasonic 60" front projection TV monitor, \$600. x37010 or 334-2612.

IBM PS1 286, FD, mouse, modem, no HD, DOS 4.01, MS Works, Prodigy, CRT, kybd, \$250 OBO. 333-6753 or 643-5962.

New Sega Genesis, 2 joysticks, Montana football, Clemens baseball, BO. Tom, 554-2258.

Compact discs, rock, pop, misc, \$7/CD. x45381.

New Compac 486SX, 16MHz, VGA color monitor, 120 MB HD, 2.5 FD, 4 MB RAM, \$700. 332-6194.

10 MB MFM, \$10; 30 MB RLL, \$20; low density 3.5 FD, \$10; sm XT-AT kybd, \$5. Charlie, x34754 or 554-7116.

Pair of Technics speakers, 100 W, 2 way, \$25/ ea or \$40/both. 335-2418.

Amiga 500 computer, 1 MB int mem, 3 MB exp mem, 1084 color monitor, ext 3.5 FD, 2 joysticks, mouse, books and SW, ex cond, \$425. x 30210 or 333-9242.

Nintendo, \$55 OBO; game cartridges, \$10 ea. x35896 or 488-7982.

PC-XT clone, 640k, mono monitor, Herc Graphics, 20 MB HD, 5.25 FD, modem, Okidata 92 printer, \$245. 488-4412.

R/C equip: new OS120 FC, \$250; new Futaba FP7AUF, \$245; CAP 21/HB60/6FG radio, \$225. Charlie, 488-4412.

Pioneer stereo, turntable, dual cassette, CD, 110 W pc, \$700. Sandi, x33854.

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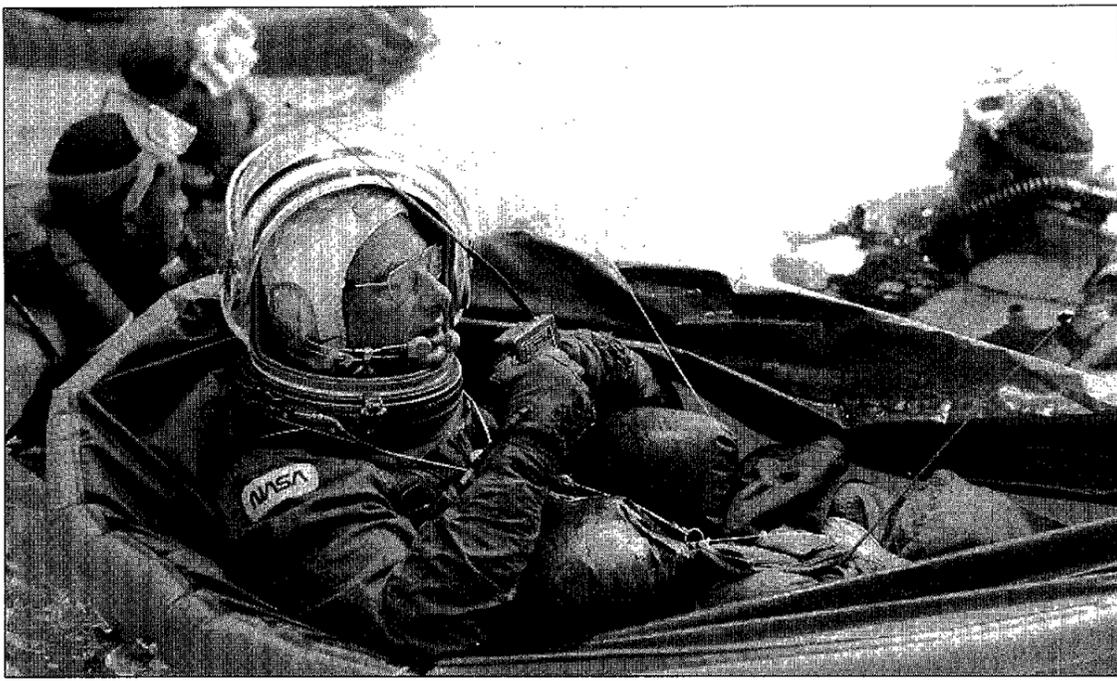
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Relief Pitchers

Backup payload specialists train as if they'll fly mission; fill vital ground support role

By Kelly Humphries

You could call them the relief pitchers of shuttle science missions. Or maybe the 12th man if you went to school in College Station. You could call them the science co-pilots, but they probably won't get the chance to fly.

They're the backup or alternate payload specialists—the scientists whose careers are as distinguished as those of the payload specialists, whose knowledge of the on-board experiments is just as extensive, whose mission training is almost as complete, and who ultimately will play a key role on the ground, talking directly with the on-board science team.

"They're kind of like relief pitchers in baseball," says Travis Brice, manager of the Flight Crew Operations Directorate's Crew Support Office, which puts together the training requirements for all payload specialists. "You've got a guy out there who works in the bullpen. Often times, he's the best guy on your staff. He's a guy who can come in and put out the fire and not miss a lick."

On STS-58, the upcoming Spacelab Life Sciences 2 mission, veterinarian Martin Fettman is the prime payload specialist, scheduled to fly this month with Commander John Blaha, Pilot Rick Searfoss, Payload Commander Rhea Seddon and Mission Specialists Bill McArthur, Shannon Lucid and Dave Wolf. Though Lucid is a career astronaut and mission specialist, she's filling an STS-58 payload specialist slot.

The backup payload specialists, who would receive equal consideration for a seat on *Columbia* if Fettman or Lucid were unable to fly, are Larry Young, a professor of aeronautics and astronautics at the Massachusetts Institute of Technology, and Jay Buckley, assistant professor of medicine at the University of Texas-Southwestern Medical Center in Dallas.

Although it is rare, backups do occasionally have to step in for their primes, Brice says. For example, Dirk Frimout filled in for Michael Lampton on STS-45 after Lampton was disqualified for medical reasons, and Millie Hughes-Fulford replace Bob Phillips on STS-40.

All payload specialists, Young says, tend to be senior members of the research community with experience in the latest laboratory techniques and knowledge of the latest findings, which makes them credible liaisons between the science and space communities. They are able to fully understand the principal investigators' hypotheses, methods, procedures and requirements and communicate them to those planning the mission and its training.

"At the same time we can communicate back to science community the importance of what's going on in the mission," Young says. "We can relate the operational constraints, which are often very difficult for the outside community to understand, and explain that for safety or crew time limitations or payload limitations that it's not practical to do the experiment as it was originally planned or would be done on the ground."

The thing most people at JSC don't see is what the payload specialists go through before they get here, Brice says, explaining that most have been working in their space-related fields for a decade before they arrive for training that lasts only 12 to 15 months.

Young has been part of the space program since 1964, when he worked with Apollo experiments with Marshall Space Flight Center. He and a group of

Canadian colleagues responded to the first call for shuttle experiments in 1976, and he was a principal investigator on vestibular function and balance experiments on Spacelab-1, Spacelab D-1, SLS-1 and SLS-2, and involved in International Microgravity Laboratory-1. Byron Lichtenberg, the first American payload specialist to fly, on STS-9 in 1983, was his student at MIT.

"Am I disappointed that I'm not prime?" he asks. "The answer is, of course, yes. But I wouldn't trade this time for anything. Although I'd prefer to fly the mission from the Spacelab rather than the POCC (Payload Operations Control Center at Marshall), I'm very pleased with the education to me and the value to my university."

Young, who has three grown children and shares a Houston-Boston commuting marriage with his wife, Jody, even rooms with the man he could replace, Fettman. "I've been kidding him that since he was selected as prime he won't eat any of my cooking, but then he wouldn't eat any of my cooking before," he says.

Training with the crew, working with the principal investigators of STS-58 is a dream come true for the oldest PS—backup or not—ever picked.

"I feel like the Indiana Jones of the space community. Here I am a middle-aged professor coming out of the ivy walls to put on my launch and entry suit and get ready to fly the shuttle and do my experiments."

Being on the inside of the flight crew has made him realize the importance of everyone's on-board experiment and the need to compromise so as to maximize the total science return from the mission.

His understanding began during payload science training, when he, Fettman and Buckley joined other members of the POCC in learning about overall ground and communications systems at Huntsville, Ala., then grew as they visited each of the principal investigator's laboratories. They tramped through the domains of world-famous scientists, studying the flight

experiments of each for the better part of a week, learning their backgrounds, training in their procedures and becoming a surrogate for the PI.

After six months, their training switched to payload operations and then to work at the Spacelab mockup at JSC. Up through the terminal countdown demonstration test, the final launch dress rehearsal, their training paralleled that of the prime payload specialist. But when integrated simulations began, Young and Buckley's roles became more support-oriented and they started concentrating on how to communicate with the payload crew from the POCC.

to the prime PS, is critical to mission success.

"I rather enjoy the communicator role," Young says. "I think Jay and I do it well because we know what the on-board crew knows. We're talking to them as one of them and we know that certain procedures don't have to be explained at length over air to ground. To give them key words is enough to launch them into doing something they've done a hundred times before. We also know what the investigators do, so if there's a piece of data missing or if something seems to be out of sequence which we know will be of concern to the investigators we're able to flag that and get it up to the crew."

Young and Buckley both give Blaha high marks for making them feel like an integral part of the crew, making sure they had offices with the rest of the crew and that they were a part of all training and social activities.

"Back doing experiments, you're only focused on doing that experiment," Buckley says. "That's your job. But here, you get to see the whole thing. You get to learn about everybody's experiment, what everybody else is doing, all the other questions they're asking, what they hope to find out. You get to learn the nuts and bolts of

putting a shuttle flight together. The more you know, the better help you can provide somebody who's developing a piece of equipment or working on a new procedure."

Buckley started his research into how the body adapts to zero-gravity in 1982, working with Gunnar Blomqvist at the University of Texas Southwestern Medical Center in Dallas on cardiovascular adaptation in zero gravity.

Following SLS-1, he was selected from among 17 nominees for payload specialist on SLS-2. Each principal investigator and mission scientist nominated two people.

"These two flights, SLS-1 and SLS-2 are really sister flights. Many of the experiments on these flights are intensive, but done on a small number of

people," Buckley says. "After SLS-1 flew we good information but on a very small number of people. With SLS-2, we'll now have information on a reasonable amount of people that will allow us to do statistics and hopefully answer some questions."

He says that the backup payload specialists play an important role in milking the best possible return out of the mission.

"We know what everybody on the flight knows. We also work closely with the people on the ground. To communicate between the two, particularly during the flight, you need that translation step. Sometimes people either provide too much information or, even worse, too little," he says.

"During the mission, while you're communicating, you do have to communicate with all the investigators, make sure they're getting what they want to get and then, also, if they have questions try to track down what's the important nugget."

He said he, too, would rather be physically on board *Columbia* as the investigations are made, but that in one sense he'll be there anyway.

"I'll be visualizing myself there going through all the scientific activities so I'll understand the work that's going on," he explains. "I won't be experiencing zero gravity, and looking out the window, but I will be there in spirit."

Shuttle flights are an enormous investment directed at getting the answers to some very basic questions, Buckley says.

"Every measurement—it may not even be a very difficult measurement to make, whether it's drawing a vial of blood, measuring somebody's weight, or just sampling their urine—every single one of those has to go just right."

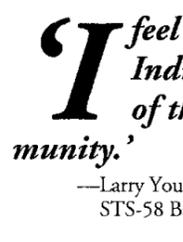
After the flight, Brice says, the Crew Support Office tries to maintain contact with the payload specialists who have flown. It is developing a science support group that sponsors Astronaut Office colloquiums where payload specialists provide follow-up briefings on the findings of their experiments.

"We keep a pretty close connections with the folks, and it's good to share what they've found out from their science applications," Brice says. "What they're trying to do is strengthen the team role there. They're all working for the good of the science on that mission." □



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—Jay Buckley
STS-58 Backup Payload Specialist



'I feel like the Indiana Jones of the space community.'

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Top: STS-58 Backup Payload Specialist Larry Young is checked out in a shuttle life raft during emergency egress training in JSC's Weightless Environment Training Facility pool. All payload specialists go through basic astronaut training, including lessons in shuttle systems and procedures, centrifuge runs through an ascent profile, and parachute and survival techniques.

Left: STS-58 Backup Payload Specialist Jay Buckley looks at Spacelab equipment during the Crew Equipment Interface Test at Kennedy Space Center. The test gives crew members an opportunity to become more familiar with payload equipment and to rehearse on-orbit payload activities. Assisting him is NASA engineer Luke Setzer.

Upper atmosphere flashes may cause trouble

Unexpected, huge flashes of light in the upper atmosphere that may affect atmospheric ozone and present potential problems for high-altitude research planes have been recorded by NASA researchers.

The flashes occurred above a severe thunderstorm in the Midwest this summer and were recorded on video taken with a special low-light-level, all-sky camera aboard NASA's DC-8 Airborne Laboratory, based at Ames Research Center. The DC-8 flew along side of the line of thunderstorms at an altitude of approximately 40,000 feet.

Professors Davis Sentman and Eugene Wescott, from the Geophysical Institute of the University of

Alaska, Fairbanks, said preliminary data on the flashes includes 19 examples of huge flashes of light that appear above storm clouds and extend up into the upper atmosphere. The flashes, which last for less than 1/30th of a second, are estimated to be about 25 miles tall, 6 miles wide, and greater than 240 cubic miles in volume. Most scientists previously did not know such flashes existed.

"In form, they look like carrots or tall jellyfish," Wescott said. One flash was recorded for about every 300 cloud-to-ground lightning strikes during the NASA mission, which flew over Kansas, Iowa, and Nebraska between 10 p.m. and midnight on

July 8.

Since the flashes are associated with thunderstorms and lightning, scientists suspect the flashes may be a form of electrical discharge. If so, they could present a concern to high-altitude research aircraft and could be responsible for creating a host of chemical reactions in the upper atmosphere, including modifications of upper atmospheric ozone.

Other theories suggest that the flashes could be glow discharges similar to light emanating from a neon tube or possibly a more passive phenomenon involving the absorption of naturally occurring ultraviolet light or x-rays. More research is needed before scientists can under-

stand what causes these flashes.

Most flashes did not appear to come directly from the storm below. "They appeared to be disconnected from the clouds. There usually was a gap between the clouds and the flashes," Wescott said.

Pilots and other sky watchers have reported seeing momentary flashes above thunderstorm clouds as early as 1886, but these rare sightings generally were ignored by the science community because these sightings were undocumented and unexpected. Sentman's and Wescott's research indicates that the flashes may not be as rare as previously thought.

"For years, it has been believed

that the area in which these flashes occur is quiet, calm, tame, almost boring," Sentman said.

Sentman and Wescott suspected otherwise. Their interest in the phenomenon, originally referred to as "upward propagating lightning," grew in 1989 when University of Minnesota researchers happened to record unusual illuminations on a video taken with a ground-based television camera.

Other upper atmospheric flashes have been identified by researchers at NASA's Marshall Space Flight Center, Huntsville, Ala., after searching through video recordings of thunderstorm activity made during several space shuttle missions.

Halloween dinner dance tickets coming

Costumes are encouraged for those who really want to get into the "spirit," but all JSC employees are invited to the upcoming Halloween Dinner Dance.

The Employee Activities Association is sponsoring the Oct. 30 dance, which starts with a social hour at 7 p.m., beef stroganoff dinner at 8 p.m. and music by the 4th Wave Rhythm Band at 9 p.m.

Prizes will be awarded for the most creative individual, couple and group costumes.

Non-refundable tickets—\$15 per person—go on sale at the Bldg. 11 Exchange Store at 8 a.m. Oct. 13; tickets sales close at 2 p.m. Oct. 27. (The Halloween dance traditionally is a popular event and ticket lines often form early.) NASA, contractor and retired employees may purchase a maximum of one table for either six, eight or 12 people, and there is open seating at each table.

For more information, call the head spook, Saverio "Mike" Gaudiano, at x58318.

Johnson Controls celebrates 20 years

Ever wonder how many lighting fixtures there are on-site or who maintains them? The answer is 124,210 and for the last 20 years those lighting fixtures have been maintained by employees of Johnson Controls World Services Inc.

On Oct. 1, Johnson Controls celebrated its 20th anniversary as the support services contractor at JSC.

As the plant maintenance and operations support services contractor, Johnson Controls maintains all the roads, sidewalks, drainage ditches, and on-site utility systems located at the center. In addition to maintaining this campus, Johnson also is responsible for the collection, treatment, storage and disposal of hazardous wastes at both JSC and Ellington Field.

A Sept. 29 open house honored the 47 employees who have been with Johnson Controls since the original contract was awarded.

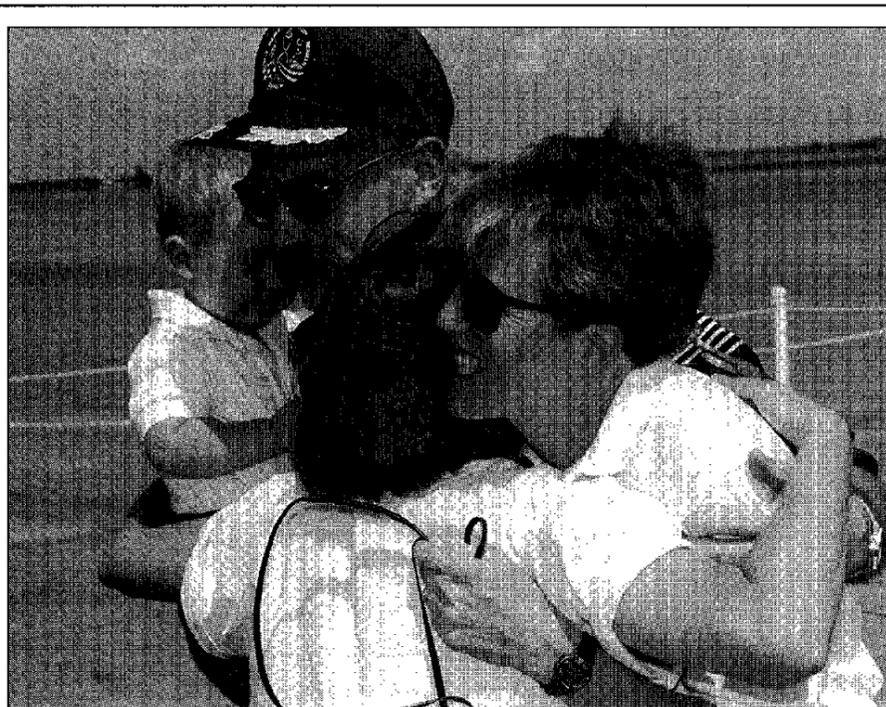
NASA Alumni League seeks volunteer greeters

The NASA Alumni League is looking for retirees who would like to be official greeters for Space Exploration '93 Oct. 25-28 at South Shore Harbour Resort and Conference Center.

Space Exploration '93 will be the fourth annual conference and exhibition hosted by the Alumni League and will feature a comprehensive program including a keynote speech by NASA Administrator Daniel S. Goldin and a panel discussion involving all eight NASA center directors.

For more information, volunteers should call Thelma Williams at 496-8119, or Betty Sue Feddersen at 333-3411.

JSC employees should call 1-800-765-7616 for registration information.



JSC Photo by Jack Jacob

FAMILY HUG— Pilot Bill Readdy holds son Sean while he and his wife, Colleen Nevius, receive a welcoming hug from Bill's sister Mary Ellen, during the homecoming ceremony at Ellington Field last week. Readdy and fellow crew members, Commander Frank Culbertson and Mission Specialists Jim Newman, Dan Bursch and Carl Walz will give their post-flight presentation to employees at 10:30 a.m. Tuesday in Teague Auditorium. The crew will also tell their story at 12:30 p.m. Thursday in the main plaza of Space Center Houston. NASA and contractor-badged employees may enter for free by showing their badges at the turnstiles.

Cordova takes reins as NASA chief scientist

Dr. France Anne Cordova, head of the Astronomy and Astrophysics Department at Pennsylvania State University, will assume the responsibilities of NASA chief scientist in mid-October.

Cordova, on extended detail from the university, will be NASA Administrator Daniel S. Goldin's senior scientific advisor and the principal liaison with the international science community, ensuring that NASA programs are regarded as scientifically and technologically well founded and are appropriate for their intended applications.

One of her critical duties will be to coordinate an integrated strategic plan for all the scientific disciplines across NASA.

"NASA and the whole scientific community are indeed fortunate that Dr. Cordova has agreed to assume this most important position. She brings to the agency a wealth of professional experience and service," Goldin said.

Cordova's scientific contributions have been in the areas of observational and experimental astrophysics, multispectral research on x-ray and gamma ray sources and space-borne instrumentation.

She is on the President's National Medal of Science Committee and is a member of the Space Science and Applications Advisory Committee of the NASA Advisory Council. She was elected vice-president of the American Astronomical Society in 1993, and has chaired of its High Energy Astrophysics Division.

USMP-1 sheds new light on fundamental physics problem

(Continued from Page 1)

Additionally, the Materials for the Study of Interesting Phenomena of Solidification on Earth and In Orbit experiment flown as part of the United States Microgravity Payload on STS-52 in October is shedding new light on a fundamental physics problem.

Results from the MEPHISTO payload have provided researchers with significant information that may help improve production of materials used in high-tech industries such as electronics and aircraft manufacturing.

"Physics theory tells us that any

solidification process will become unstable under certain circumstances, causing changes to the structural properties of the resulting product," said Dr. Jean Jacques Favier, principal investigator for MEPHISTO. "On USMP-1 we were, for the first time, able to identify and quantify very regular cellular patterns in the structure of a sample alloy at or very near the threshold where the solidification process became unstable. This is important knowledge because if we can predict and ultimately control these patterns, we may be able to produce new or

improved materials."

The MEPHISTO experiment was complemented by the Shuttle Acceleration Measurement System and allowed researchers to quantify the effects of shuttle accelerations or disturbances on the solidification process. "We were able to detect, measure and study the impact of larger accelerations like those caused by the shuttle's orbital maneuvering system firings on the conformity and quality of the crystal," Favier said.

This is important because the homogeneity or regularity of the

internal texture of an alloy must be controlled to a very fine scale of a few micrometers or less and will be valuable to researchers as they plan for future microgravity studies aboard the space shuttle and space station.

The MEPHISTO program, a cooperative effort between the French nuclear and space agencies and NASA, is a basic study of solidification processing of materials such as metals, alloys or semi-conductors.

The experiment is scheduled to fly up to five more times beginning with USMP-2 in early 1994.

Global positioning system aircraft landing tests work

(Continued from Page 1)

The aircraft guidance information was unaided by the flight management system or other avionics. The landings used raw, differential GPS guidance supplied to the autopilot in the Boeing 737. A laser tracker, placed at a known geographical reference point near the runways, served as an independent reference

system for aircraft-based measurements.

The code tracking technique used for the tests is a simpler way to determine aircraft position that is expected to lead to more economical DGPS ground systems and avionics. That could make satellite guidance of precision approaches and landings practical for commercial aircraft.

The aviation industry now is doing tests with the Global Positioning System to see if the satellite technology is feasible for widespread private and commercial airline use in precision approach landings. The technology could provide an inexpensive, worldwide, all-weather landing system. Differential techniques are used to augment or cor-

rect raw signals beamed through space from the GPS satellites.

FAA is evaluating DGPS readiness for precision approach and landing. FAA and other international civil aviation authorities will meet in 1995 to examine the results of these evaluations and agree on a worldwide policy for the use of DGPS for navigation and landing.

Unisys earns Baldrige visit

(Continued from Page 1)

consideration. Prior to submitting that application, however, the organization last year conducted a thorough self-assessment against Baldrige award criteria to prepare for the competition. The Baldrige criteria scrutinize all aspects of business operations with special attention to customer satisfaction issues.

The application is reviewed by an independent board appointed by the National Institute of Standards and Technology and the highest-scoring organizations are selected for site visits by Baldrige examiners. The examiners review the sites accord-

ing to rigorous award criteria and make recommendations to the award's panel of judges.

There are several award categories and Space Systems is one of five finalists being considered in the service category of the competition. Four other service providers, as well as four organizations each from the manufacturing and small business categories received site visits.

President Clinton will honor the 1993 Baldrige recipients later this year at the White House. The award, presented annually by the Commerce Department, recognizes quality performance in business.

Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Monday by the Public Affairs Office for all space center employees.

Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor Kelly Humphries
Associate Editor Kari Fluegel

STS-61 next up

(Continued from Page 1)

prepared for STS-60, targeted for a January 1994 launch to carry the Wake Shield Facility aloft. Last week, the Orbiting and Retrievable Far and Extreme Ultraviolet Spectrometer and its Shuttle Pallet Satellite telescope platform were removed from *Discovery's* cargo bay, and the auxiliary power units were inspected.

Endeavour is on target for a launch of STS-61 around early December to service the Hubble Space Telescope. Currently in the Bay 1 hangar, *Endeavour's* main engines were to be installed during the weekend.